

GLOSSARY

Access control: It refers to regulating the flow of people through an entry and exit door.

Actuator: It is a component of a machine that is responsible for moving and controlling a mechanism or system.

Air spaced PE: It refers to a coaxial cable that uses air injected into plastic as a dielectric spacer between conductors. It is also known as 'foam dielectric'.

Alloy: It is a metal formed by mixing two or more metals together or by mixing metal with another substance. For example, brass is an alloy of copper and zinc.

Alternating Current (AC): It refers to an electric current that reverses direction at regular intervals. The abbreviation AC is commonly used.

Aluminium conductor: It is a part of a wire, which carries electric current.

Ampacity: It refers to the maximum current, in amperes, that a wire can carry safely without over heating.

Ampere: It refers to the strength of an electrical current. It is measured in amperes.

Ampere (amp): Named after Andre-Marie Ampere, it is a unit used to measure electric current.

Ampere/hour (AH): It is the measurement of a battery's capacity. One ampere of current flowing for one hour equals one ampere/hour.

Amplitude: It is the maximum absolute value reached by a voltage or current waveform.

Anode: It is the positively charged electrode by which electrons leave an electrical device.

Arc blast: It occurs from high-amperage currents arcing through air. This abnormal current flow is initiated by contact between two energised points.

Arcing: It refers to luminous electrical discharge or electrical sparking through the air that occurs when high voltages exist across a gap between conductors.

Armour: Generally, placed over the outer sheath, it is an outer braid of metal or spiral steel tapes, primarily, for the purpose of mechanical protection.

Bandwidth: It is the range or band of frequencies that an electronic signal uses on a given transmission medium. Bandwidth is expressed in terms of the difference between the highest and lowest frequency signal components.

Bare conductor: Such a conductor is not covered with an insulating material.

Battery: It is an electrochemical cell that can be charged electrically to provide static potential for power or released electrical charged

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when needed. A battery consists of an anode, a cathode and electrolyte. It is used for powering devices, such as flashlights, mobile phones and electric cars.

Breather: It is a device present in a transformer to filter out moisture. A breather consists of silica gel, which absorbs moisture from air.

Bend cable: It refers to two or more cables, which have been joined together by stainless steel strapping.

Bend radius: The radius of curvature that determines how tightly a cable can bend without damaging its electrical performance.

Bending loss: It is a loss that takes place in a fibre optic system caused by the bending of cable.

Biasing: It is the method of establishing predetermined voltages and currents at various points in a circuit to set the appropriate operating point.

Bipolar: It relates to a device capable of using two polarisations, such as a transistor that uses positive and negative charge carriers.

Block diagram: It is a diagram that shows the relationship between various devices in a system. Blocks used to represent each piece of equipment are arranged in a system diagram that shows their physical or operational relation with each other.

Bonding: It refers to the joining of electrical parts to assure a conductive path.

Bonding jumper: It is a reliable conductor that ensures the required electrical conductivity between metal raceways, which is required to be electrically connected.

Boring tool: This tool is used for drilling and boring. They are used to make holes in material like wood.

Braid: It refers to a group of small wire strands interwoven to form a cylinder surrounding a dielectric.

Braid coverage: It refers to the braided filament cover in the inner part of a cable. Tighter mesh material offer a higher percentage of coverage.

Breadboard: It is a thin plastic board full of holes that is used to hold components wired together. It is commonly used for prototyping and experimenting with circuit designs.

Breakdown (puncture): It refers to a disruptive discharge through insulation.

Bridge rectifier: It is a rectifier with four elements connected as a bridge circuit with direct voltage secured from one pair of opposite junctions when alternating voltage is applied to the other pair.

Burns: These are caused when a person touches an electrical wire or equipment that is not installed correctly or is ill-maintained. Burn injuries caused by electricity, typically, occur on the hands.

Buzzer: It is an electric signalling device that produces a buzzing sound as a signal.

Cable: Alternatively referred to as a cord, connector or plug, a cable consists of one or more wires covered with plastic. A cable transmits power or data to devices or locations.

Cable attenuation: Expressed in decibels (dBs), it is the loss or reduction in signal strength. Attenuation is a naturally occurring effect when transmitting signals over distance.

Cable core: It is the portion of an insulated cable lying under a protective covering or jacket. It contains the conductor part of a cable.

Cable sheath: It is used to help bundle several conductors together if a cable consists of multiple wires.

Capacitor: It is a device used in electrical circuits. A capacitor stores an electrical charge for a short duration, and then, returns it to the circuit. Common types of capacitor includes tantalum, electrolytic, ceramic and film capacitors.

Capacitance: It is the property of a capacitor to hold charge. It is measured in Farad.

Cathode: A cathode is a type of electrode through which electrons move.

Central conductor: It is a wire in the centre of a coaxial cable, the diameter of which is based on the American Wire Gauge (AWG), a standardised gauge system.

Ceramic capacitor: It is a capacitor made of alternating layers of metal and ceramic, with the ceramic material acting as the dielectric.

Channel lock pliers: These are used for grabbing and pinching things. Their gripping jaws provide a strong grip on an object. They are made of high-carbon steel.

Circuit breaker: It is a device that protects an electrical circuit from damage caused by excess current due to overload or short circuit. It automatically stops electric current if it becomes dangerous.

Circuit: It is a complete path of wires and equipment along which electric current flows.

Closed circuit: It is an electric circuit that provides an uninterrupted path for the flow of current.

Closed position: Relating to switches, it is a position in which current can flow.

CMOS: It is the abbreviation for Complementary Metal Oxide Semiconductor. It is a class of integrated circuits.

Coaxial adapter: It is a connector used to join a coaxial cable to different cables.

Coaxial cable: Also called coax cable, it is a type of electrical cable that has an inner conductor surrounded by a tubular insulating layer, which is further surrounded by a tubular conducting shield. Many coaxial cables also have an insulating outer sheath or jacket.

Coaxial connector: It is a connector used to join two coaxial cables.



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Coil: It refers to a series of circles formed by the winding of an insulated wire, which creates a magnetic field when electric current passes through the circles.

Colour code: Colour code is used for purposes of identification of wires in a multi-conductor cable.

Composite cable: It is a cable consisting of two or more types or sizes of wire or cable.

Conductor: It is a substance that allows electricity or heat to pass through it.

Conduit: It is a pipe, channel, tube or trough for protecting electrical wires or cables from environmental effects.

Connector: It is a device that joins two or more conductors and terminals of equipment.

Continuity: Such a situation is established when a complete path for current exists.

Control box: It is a metal sheet enclosure that contains electronic and electromechanical controls and circuit.

CPR: Abbreviation for Cardiopulmonary Resuscitation, it refers to an emergency procedure that involves giving artificial breathing and heart massage to someone who is not breathing or does not have a pulse.

Critical resistance value: It refers to the maximum nominal resistance value at which a rated power can be loaded without exceeding the maximum working voltage. The rated voltage is equal to the maximum working voltage in critical resistance value.

Current: It is the amount of electric charge flowing through a wire at a specified point of circuit in one second. It is represented by the symbol 'I'.

De-energise: It is the process of shutting down the energy sources to circuits and equipment and depleting any stored energy.

Desoldering tools: These tools are used to remove soldered wires and components on printed circuit boards for repair and troubleshooting, usually, when there is a fault in the connections.

Dielectric: It is an insulating or non-conducting material between outer and inner conductors in a coaxial cable.

Dielectric withstanding voltage: It refers to the rated voltage that can be applied to a designated point between a resistive element and the outer coating, or the resistive element and the mounting surface without causing dielectric breakdown.

Diode: It is an electronic device, in which electric current passes in one direction only, e.g., silicon chip.

Direct current (DC): It refers to electric current flowing in one direction only (i.e., current produced using a battery). The abbreviated form DC is commonly used.

Double Pole Double Throw switch (DPDT): It is a switch that has two inputs and four outputs. Each input has two corresponding outputs.

Double Pole Single Throw switch (DPST): It is a four-terminal switch or relay contact arrangement that simultaneously opens or closes two separate circuits or both sides of the same circuit (two input and two output).

Dual In-line Package (DIP): In microelectronics, a Dual In-line Package (DIP or DIL) or Dual In-line Pin Package (DIPP) is an electronic component package with a rectangular housing and two parallel rows of electrical connecting pins.

Duty cycle: It is the percentage of time or operating time of a device. For example, a device that is ON for one minute and OFF for nine minutes, it is operating at a 10 per cent duty cycle.

Earth continuity conductor: It is a conductor wire connected with different electrical devices and appliances like distribution board, plugs, etc. Hence, the wire between earthing lead and electrical device or appliance is called 'earth continuity conductor'. It may be in the shape of a metal pipe (fully or partial), cable metallic sheath or flexible wire.

Earth electrode: When a conductor or conductive plate is buried in the earth for electrical earthing system, it is known as an 'earth electrode'. Earth electrodes come in different shapes like conductive plate, conductive rod, metal water pipe or any other conductor with low resistance.

Earth resistance: This is the total resistance between earth electrode and earth (measured in Ohms). Earth resistance is the algebraic sum of the resistances of earth continuity conductor, earthing lead, earth electrode and earth.

Earth: It is the connection between electrical installation systems via a conductor to the buried plate in the ground.

Earthed: When an electrical device, appliance or wiring system is connected to the earth through earth electrode, it is known as earthed device or 'earthed'.

Earthing lead: It refers to a conductor wire or conductive strip connected between earth electrode, electrical installation system and devices.

Electricity: It is a form of energy produced from charged elementary particles, usually, supplied as electric current through cables, wires, etc., for lighting, heating, driving machines, etc.

Electrolytic capacitors: It is a polarised capacitor, whose anode or positive plate is made of a metal that forms an insulating oxide layer through anodisation. This oxide layer acts as a dielectric of the capacitor.

Electromagnet: It is a coil of wire, usually, wound on an iron core, which produces a strong magnetic field when current is passed through the coil.



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Electromagnetic Interference (EMI): Also called Radio Frequency Interference (RFI) when in the radio frequency spectrum, it is a disturbance generated by an external source that affects an electrical circuit by electromagnetic induction, electrostatic coupling or conduction.

Electromechanical: It indicates conversion of an electrical signal to mechanical movements and vice versa.

Electromechanical assembly: It combines both electrical and mechanical components, and sometimes, electronic components as well.

Electromotive force (EMF): It is the measurement of energy that causes current to flow through a circuit. It can also be defined as the potential difference in charge between two points in a circuit.

Electron: It is a negatively charged subatomic particle. It can be either free (not attached to an atom) or bound to the nucleus of an atom.

Energised: It is defined as the presence of energy in a circuit, equipment, device or component.

Energy meter: Also called an electricity, electric or electrical meter, it is a device that measures the amount of electric energy consumed by a house, business or device.

Electric starter: It is a device that controls the use of electrical power in an equipment, usually, a motor. As the name suggests, an electric starter starts the motor and can also stop, reverse and protect it from technical glitch.

Electrostatic discharge: It is a form of current that is left within an insulating body after the power source is removed.

Farad: Represented by (F), Farad is the SI derived unit of electrical capacitance, which refers to the ability of a body to store an electrical charge. It is named after the English physicist Michael Faraday.

Fault current: It refers to current that does not travel in its intended path.

Ferrite core: It is a type of magnetic core made of ferrite, on which the windings of electric transformers and other wound components, such as inductors are formed.

Filled cable: In telecommunication, a filled cable is a cable that has gel or oil inside the jacket or sheath.

Fixed wiring: Such a wiring is permanently installed in homes and other buildings.

Flexible wiring: These are electrical cables, especially designed to cope with the tight bending radii and physical stress associated with moving applications, such as inside cable carriers.

Frequency: It is the rate at which a sound or electromagnetic wave vibrates per unit of time. It is expressed in Hertz (Hz).

Fuse: It is a small wire or device inside a piece of electrical equipment that breaks or stops the current if the flow of electricity is too strong.

Gain: Also called 'amplification', it refers to an increase in signal power, voltage or current by an amplifier, expressed as the ratio of output to input.

Gauge: It denotes the physical size of a wire.

Germanium: It is a chemical element with the symbol 'Ge' and atomic number 32. It is a lustrous, hard, brittle and greyish-white metalloid.

Ground fault: It refers to inadvertent contact between an energised conductor and ground or equipment frame.

Ground potential: It refers to the potential of earth, which is used in circuit parameter calculation.

Ground Fault Circuit Interrupter (GFCI): Also called Residual Current Device (RCD), it is a type of circuit breaker, which shuts off electric power supply when it senses imbalance between outgoing and incoming current.

Grounding: Also known as 'earthing', it is the process of passing fault current from an equipment into the earth surface.

Heat sink: It is a passive heat exchanger that transfers heat generated by an electronic or mechanical device to a fluid medium, air or some liquid coolant, allowing regulation of the device's temperature.

Hertz (Hz): It is the unit to measure the frequency of sound waves.

High pass filter: It refers to a filter that blocks low frequencies and allows high frequencies to pass through.

High-tension wire: It is a wire used for transmitting electrical energy having high voltage over long distances. High-tension wires need to be of low resistance so as to minimise heat loss and withstand high voltages.

IC: It is the abbreviation for Integrated Circuit. It is a microscopic array of electronic circuits diffused or implanted onto the surface of a single chip of semiconducting material, such as silicon.

IEC: It is the abbreviation for International Electrotechnical Commission, similar to International Standards Organization (ISO).

IEEE: It is abbreviated form of the Institute of Electrical and Electronic Engineers.

Impedance: It is the measurement of total resistance of a piece of electrical equipment, etc., to the flow of an alternating current, arising from the combined effects of Ohmic resistance and reactance. It is represented by the symbol 'Z'.

Inductance: It refers to the property of an electric conductor or circuit that causes an electromotive force to be generated by a change in the current flowing.

Inductor: Also called coil, choke or reactor, it is a passive two-terminal electrical component that stores energy in a magnetic field when electric current flows through it. An inductor, typically, consists of an insulated wire wound onto a coil around a core.

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Infrared (LEDs): Also called infrared light emitting diode, it is a solid state lighting (SSL) device that emits light in the infrared range of electromagnetic radiation spectrum. Infrared LEDs allow for cheap and efficient production of infrared light, which is electromagnetic radiation in 700 nm to 1 mm range.

Insertion loss: It is the loss of power signal due to the insertion of a device in a transmission line or optical fibre. It is expressed in decibels (dB).

Insulation: It refers to the act of protecting something with a material that prevents heat, sound or electricity from passing through. It is used for protecting wire, cable and tools.

Insulator: It is a material or device used to prevent heat, electricity or sound from escaping something. In other words, it is a material whose internal electric charges do not flow freely. Little electric current will flow through it under the influence of an electric field. This is opposite to other material, semiconductors and conductors, which conduct electric current easily.

Inverter: It is a device used to convert direct current into alternating current. It is also a type of logic gate with a single input.

Isolation: It refers to a condition where there is no electrical connection between two or more circuits.

Jacket: It is an insulating layer made of plastic or rubber covering a cable or bundle of wires.

Jumper: It refers to an electrical wire or group of wires in a cable, with a connector or pin at each end.

Junction: It is a point in a circuit, where two or more wires are connected.

Junction box: It is a protective enclosure for connecting circuit wires.

K Ohm: It is the symbol for one thousand ohms.

Kilowatt-hour: It is used to measure electrical energy equivalent to power consumption of one thousand watt for one hour.

Lamp: It is a glass bulb or tube that emits light produced by electricity (such as incandescent light bulb or fluorescent lamp).

Leakage current: It is a current that does not return through the intended path but, instead, 'leaks' into the ground.

Live circuit: It is a circuit with applied voltage.

Load: It refers to electrical power consumed by a device.

Loop resistance: Consider a cable having two conductors. Strip both the ends of the cable. After stripping, there are two conductor terminals at each side of the cable. Take any one end and twist it together with the two stripped conductors. Measure the resistance of both the wires by connecting the remaining two terminals with the multimeter. This resistance value is called loop resistance.

Low pass filter: It is a filter designed to transmit electromagnetic frequencies below a certain value, while excluding those of a higher frequency.

Lumen: It is the unit of luminous flux. It is represented by the abbreviation 'lm'. It is used to measure the total visible light emitted by a source per second.

Maximum overload voltage: It is the maximum voltage that the insulation strength or internal construction of a component can stand. It comes into consideration for components that have high rating. So, their wattage or dissipation ratings do not exceed before insulation breakdown.

Maximum working voltage or maximum limiting element voltage: It is the maximum voltage a resistor can withstand constantly without arcing. Maximum working voltage is often expressed as 'Vrms'.

Microwave frequency: It is the range of frequency utilised by a microwave equipment. It ranges from 300 MHz to 300 GHz.

Milliampere (milliamp or mA): It defines 1/1,000 of an ampere.

Multimeter: It is an electronic measuring instrument that combines several measurement functions in one unit. A typical multimeter can measure voltage, current and resistance.

N-type semiconductor: It is a semiconductor to which doping material is added to increase the number of free charge carriers.

National Electrical Code (NEC): It is a standard for safe installation of electrical wiring and equipment.

Non-polar: Also called non-polarised capacitor, it is a type of capacitor that has no implicit polarity. It can be connected in either way in a circuit. Ceramic, mica and some electrolytic capacitors are non-polarised.

Nose pliers: This tool comes handy in gripping components with short leads that need to be soldered onto or desoldered from the PCB but cannot be held with bare hands.

Ohm: It is the unit of electrical resistance and impedance, abbreviated with the symbol omega. Resistance is the opposition offered by a substance to the passage of electrical current.

Ohm's law: It was propounded by German scientist G. S. Ohm. It defines the relationship, between voltage, current and resistance of a circuit. It states current is directly proportional to applied voltage.

Open circuit: It is a circuit, which is broken. In such a circuit, current will not flow.

Operating temperature: It refers to a temperature range, in which a device will perform within its specified designed tolerances. It may be measured in degrees Fahrenheit (F) or degrees centigrade (C).

Operating voltage: It is the actual voltage drawn by the equipment for operation.

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Operational amplifier: It refers to an amplifier with high gain and high input impedance (usually, with external feedback) used, especially, in circuits for performing mathematical operations on an input voltage.

Over current: It refers to current in excess of the rated current or ampacity. It may result from overload, short circuit or ground fault.

Over current protection device: It is a device that prevents a cable, wire or an appliance from over current.

Overload: It is the load beyond the capacity of a circuit.

P-type semiconductor: It is a semiconductor to which doping material is added to decrease the number of electrons.

PE: It is the abbreviation for Polyethylene, a thermoplastic insulator with electrical properties.

Pliers: These are multi-purpose tools used for cutting, gripping and stripping of wires.

PN junction: It refers to a boundary or interface between two types of semiconductor material — p and n-type — inside a single crystal of semiconductor.

Polarity: It refers to the positive or negative orientation of a signal or power source.

Polyvinylchloride: It is a family of insulating compounds, whose basic ingredient is either polyvinylchloride or its co-polymer with vinyl acetate in combination with appropriate plasticisers, stabilisers, fillers and pigments.

Potentiometer: It is a variable resistor.

Power rating: In electrical and mechanical engineering, the power rating of an equipment is the highest power input allowed to flow through the particular equipment. The word 'power' refers to electrical or mechanical power.

PPE: It stands for Personal Protective Equipment.

Primary winding: It refers to transformer winding that receives energy from a supply circuit.

PTFE: It is the abbreviation for Polytetrafluoroethylene, also known as Teflon. PTFE is a fluoropolymer insulation or jacketing material.

Rated power: It refers to the maximum amount of power that can be continuously applied to electrical and electronic components at rated ambient temperature.

Rated voltage: It refers to the maximum value of DC or AC voltage (rms) capable of being applied continuously to electrical and electronic components at rated ambient temperature

Regulated power supply: It refers to power supply that provides constant output regardless of input voltage.

Relay: It refers to an electrically controlled device that opens and closes electrical contacts to affect the operation of other devices in same or another electrical circuit.

Reliability: It is the probability that a device will perform its desired function.

Reset time: It is the time required to return the output to its original condition.

Resistance: The electrical resistance of an object is a measure of its opposition to the flow of electric current. 'R' is the symbol for resistance.

Resistor tolerance: It is expressed as deviation from nominal value in per cent and is measured at 25 °C only with no appreciable power applied.

Resistor: It is a component that resists electric current by producing a drop in voltage.

RF (Radio Frequency): It is the band of frequencies suitable for telecommunications, satellite and radar.

Rotor: It is the rotating part of an electric generator and motor.

Screwdriver: It is a manual or powered tool with a narrow blade that is especially shaped at the end and is used for turning screws. A screwdriver has a handle and a shaft, ending in a tip.

Semiconductor: It is a solid material, whose electrical conductivity at room temperature is between that of a conductor and insulator. The most common semiconductor material is silicon.

Series circuit: It refers to a circuit, in which current runs sequentially through each component.

Shielding: It is a metallic layer surrounding a conductor(s) to prevent electromagnetic interference within the cable and devices outside the cable.

Shock: It refers to electrical current that passes through a part of a person's body. Electric shock occurs when the human body becomes part of a path through which electrons are flowing.

Short circuit: It is an electrical circuit that allows current to travel along an unintended path with no or very low electrical impedance. This results in excessive current flowing through the circuit.

Side cutting pliers: These tools are used for cutting wires, screws and nails. They are also called 'diagonal cutting pliers' because the cutting blades are at an angle to the handles.

Silicon: It is a chemical element with the symbol 'Si' and atomic number 14. It is a hard, brittle crystalline solid with a blue-grey metallic lustre. It is a tetravalent metalloid and semiconductor.

Sine wave: Also called sinusoid, sine wave is a mathematical curve that describes smooth periodic oscillation. A sine wave is a continuous wave.

Soldering iron: It is a hand tool used for soldering. It supplies heat to melt solder to form an electrical and physical connection between two surfaces. A soldering iron is made of a heated metal tip and an insulated handle.



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Soldering station: A soldering station is a multipurpose power soldering device designed for soldering electronic components.

Solenoid: It is a type of electromagnet. The purpose of a solenoid is to generate a controlled magnetic field through a coil wound onto a tightly packed helix.

Spike: It refers to momentary increase in electrical current. Spikes can damage electronic equipment.

Static electricity: It is a form of current that is left within an insulating body after the power source is removed.

Stator: It is a stationary part of a rotary system found in electric generators and motors.

Stray capacitance: It refers to undesirable capacitance between circuit wires, components and chassis, or between wires and chassis in an electronic equipment.

SWG: It stands for Standard Wire Gauge. It is used to measure the size of wires.

Switch: It is a small device that is pressed up or down in order to turn a light or piece of electrical equipment on and off. It also connects or breaks connections in an electrical circuit.

Tantalum capacitor: It is an electrolytic capacitor, which consists of a pellet of porous tantalum metal as anode, covered by an insulating oxide layer that forms the dielectric, surrounded by liquid or solid electrolyte as cathode.

Temperature rating: It is the maximum allowable temperature at which an electric equipment may be used.

Terminal: It is a position in a circuit or device at which a connection is normally established or broken.

Thermistor: A combination of 'thermal' and 'resistor', it is a type of resistor, whose resistance is dependent on temperature, more so than in standard resistors.

Tolerance: Normally expressed in a percentage, it is the maximum allowable deviation of electrical, environmental or dimensional parameters.

Transformer: It is a unit for converting an alternating electrical current from high to low potential voltage or vice versa. Transformers work on AC.

Transistor: It is a small electronic device, containing a semiconductor and at least three electrical contacts used in a circuit as an amplifier, detector or switch.

Trip: It refers to automatic opening (turning off) of a circuit by a circuit breaker.

Utility knife: It is one of the essential tools used in carrying out electrical works as it can cut through most material.

Variable capacitor: It is a capacitor, whose capacitance can be altered by changing the effective area of the plates or the distance between the plates.

Variable resistor: It is type of resistor, in which resistance value can be varied manually. It is also known as 'potentiometers'.

Volt: It is the unit of electric potential and its symbol is 'V'.

Voltage divider: It is a passive linear circuit that produces an output voltage that is a fraction of its input voltage. Voltage division is the result of distributing input voltage among the components of the divider.

Voltage drop: It refers to the decrease in electrical potential along the path of current flowing in an electrical circuit.

Voltage regulator: It is a circuit, which maintains a constant voltage across a load irrespective of variable input voltage.

Watt: It is the unit of an electric power. Its symbol is 'W'.

Watt hour: It is a measure of electrical energy equivalent to power consumption of one watt for one hour.

Wave form: It is the representation of a wave in graph-form achieved by plotting wave against time.

Wire duct: It is used to route, protect and organise electrical cables and wires, typically, within a control panel.

Wrench: It is a tool used to turn objects, usually, rotary fasteners like nuts and bolts or to keep them from turning.

XLPA: It stands for Cross-Linked Extruded Polyalkene.

XLPE: Also abbreviated as XLP, it stands for Cross-Linked Polyethylene.

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LIST OF CREDITS

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Unit 1

Fig.1.1(a), Fig.1.2, Fig.1.3, Fig.1.4(a), Fig.1.4(b), Fig.1.5, Fig.1.6, Fig.1.7, Fig.1.9, Fig.1.12, Fig.1.13, Fig.1.14, Fig.1.16(a), Fig.1.16(b), Fig.1.17, Fig.1.18, Fig.1.19, Fig.1.20, Fig.1.21(a), Fig.1.21(b), Fig.1.22(a), Fig.1.22(b), Fig.1.23(a), Fig.1.23(b), Fig.1.24, Fig.1.25, Fig.1.26, Fig.1.27, Fig.1.28, Fig.1.29, Fig.1.30, Fig.1.31, Fig.1.32, Fig.1.33, Fig.1.34, Fig.1.35, Fig.1.36

Assignment 3

Fig.1, Fig.2

Assignment 5

Fig.1, Fig.2

Assignment 6

Fig.1

Check Your Progress

Fig.1, Fig.2, Fig.3, Fig.4

Key Concepts

Fig.1(a), Fig.1(b)

Practical Exercise 1

Fig.1, Fig.2

Practical Exercise 2

Fig.1

Practical Exercise 3

Fig.1, Fig.2, Fig.3, Fig.4, Fig.5

Practical Exercise 4

Fig.1, Fig.2, Fig.3

Practical Exercise 5

Fig.1, Fig.2

Practical Exercise 6

Fig.1

Unit 2

Fig. 2.1, Fig. 2.2, Fig. 2.3(a), Fig. 2.3(b), Fig. 2.4, Fig. 2.5 (a and b), Fig. 2.6 (a and b), Fig. 2.7 (a and b), Fig. 2.8, Fig. 2.9 (a and b), Fig. 2.10, Fig. 2.11, Fig. 2.12, Fig. 2.13, Fig. 2.14, Fig. 2.15, Fig. 2.16, Fig. 2.17, Fig. 2.18, Fig. 2.19, Fig. 2.20, Fig. 2.21, Fig. 2.22, Fig. 2.23, Fig. 2.24, Fig. 2.25, Fig. 2.26, Fig. 2.27, Fig. 2.28 (a and b), Fig. 2.29, Fig. 2.30, Fig. 2.31, Fig. 2.32, Fig. 2.33, Fig. 2.34, Fig. 2.35, Fig. 2.36, Fig. 2.37, Fig. 2.38, Fig. 2.39 and Fig. 2.40

Table 2.1 Different types of inductor

Fig.1, Fig. 2, Fig. 3

Practical Exercise 1

Fig. 1

Practical Exercise 2

Fig. 1

Practical Exercise 3

Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 5

Practical Exercise 4

Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 5

Assignment 1

Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 5

Assignment 4

Fig. 1, Fig. 2, Fig. 3, Fig. 4

Assignment 5

Fig. 1, Fig. 2, Fig. 3

Assignment 6

Fig. 1

Check Your Progress

Fig. 1, Fig. 2, Fig. 3

Unit 3

Fig. 3.1(a), Fig. 3.1(b), Fig. 3.1(c), Fig. 3.2, Fig. 3.,3Fig. 3.4, Fig. 3.5, Fig. 3.6, Fig. 3.7, Fig. 3.8, Fig. 3.9, Fig. 3.10, Fig. 3.11, Fig. 3.12, Fig.3.13, Fig.3.14

Alphanumeric coded resistor

Fig.1, Fig.2, Fig.3, Fig.4, Fig.5, Fig.6, Fig.7, Fig.8, Fig.9, Fig.10, Fig.11, Fig.12

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Assignment 1

Fig.1

Assignment 2

Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 5

Table 3.1

Fig.1

Table 3.2

Fig. 3.7(a), Fig. 3.7(b), Fig. 3.7(c), Fig. 3.7(d), Fig. 3.7(e), Fig. 3.7(f), Fig. 3.7(g), Fig. 3.7(h), Fig. 3.7(i)

Unit 4

Fig. 4.1(a), Fig. 4.1(b), Fig. 4.1(c), Fig.4.2, Fig.4.3, Fig.4.4, Fig. 4.5, Fig.4.6, Fig.4.7 (a), Fig.4.7 (b), Fig.4.8, Fig.4.9, Fig.4.10, Fig.4.11, Fig.4.12, Fig.4.13, Fig.4.14

Unit 5

Fig. 5.1, Fig. 5.2, Fig. 5.3, Fig. 5.4, Fig. 5.5, Fig. 5.6, Fig. 5.7, Fig. 5.8, Fig. 5.9, Fig. 5.10

Unit 6

Fig. 6.1(a), Fig. 6.1(b), Fig. 6.2, Fig. 6.3, Fig. 6.4, Fig. 6.5(a), Fig. 6.5(b), Fig. 6.6, Fig. 6.7, Fig. 6.8, Fig. 6.9, Fig. 6.10(a), Fig. 6.10(b), Fig. 6.11, Fig. 6.12, Fig. 6.13

Practical Exercise 1

Fig.1, Fig.2, Fig.3, Fig.4, Fig.5

Table 6.1 Electrical Safety

Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 5, Fig. 6, Fig. 7, Fig. 8, Fig. 9, Fig. 10

Unit 7

Fig.7.1 (a), Fig.7.1 (b), Fig.7.2, Fig.7.3, Fig.7.4, Fig.7.5 (a), Fig.7.5(b), Fig.7.5(c), Fig.7.6, Fig.7.7, Fig.7.8(a), Fig.7.8(b), Fig.7.9, Fig.7.10, Fig.7.11, Fig.7.12, Fig.7.13, Fig.7.14, Fig.7.15, Fig.7.16, Fig.7.17, Fig.7.18, Fig.7.19, Fig.7.24, Fig.7.25, Fig.7.26, Fig.7.27, Fig.7.28, Fig.7.29, Fig.7.30, Fig.7.31

Unit 8

Fig.8.1, Fig.8.2, Fig.8.3, Fig.8.4, Fig.8.5, Fig.8.6, Fig.8.7, Fig.8.8, Fig.8.9, Fig.8.10, Fig.8.11, Fig.8.12, Fig.8.13(a), Fig.8.13(b), Fig.8.14, Fig.8.15, Fig.8.16, Fig.8.17, Fig.8.18, Fig.8.19, Fig.8.20, Fig.8.21, Fig.8.22, Fig.8.23, Fig.8.24, Fig.8.25, Fig.8.26

Unit 9

Fig.9.1, Fig.9.2(a), Fig.9.2(b), Fig.9.3 (a), Fig.9.3 (b), Fig.9.4 (a), Fig.9.4 (b), Fig.9.5, Fig.9.6, Fig.9.7, Fig.9.8, Fig.9.9, Fig.9.10, Fig.9.11, Fig.9.12, Fig.9.13, Fig.9.14, Fig.9.15, Fig.9.16, Fig.9.17, Fig.9.18, Fig.9.19, Fig.9.20, Fig.9.21, Fig.9.22, Fig.9.23, Fig.9.24, Fig.9.25, Fig.9.26, Fig.9.27, Fig.9.28, Fig.9.29, Fig.9.30, Fig.9.31, Fig.9.32, Fig.9.33, Fig.9.34, Fig.9.35, Fig.9.36, Fig.9.37, Fig.9.38, Fig.9.39, Fig.9.40, Fig.9.41, Fig.9.42, Fig.9.43, Fig.9.44, Fig.9.45, Fig.9.46, Fig.9.47, Fig.9.48, Fig.9.49, Fig.9.50, Fig.9.51, Fig.9.52, Fig.9.53, Fig.9.54, Fig.9.55, Fig.9.56, Fig.9.57, Fig.9.58, Fig.9.59, Fig.9.60, Fig.9.61, Fig.9.62, Fig.9.63, Fig.9.64, Fig.9.65, Fig.9.66, Fig.9.67, Fig.9.68, Fig.9.75, Fig.9.76, Fig.9.77, Fig.9.78, Fig.9.79, Fig.9.80, Fig.9.81

Unit 10

Fig.10.1, Fig.10.2(a), Fig.10.2(b), Fig.10.3, Fig.10.4, Fig.10.5, Fig.10.6, Fig.10.7, Fig.10.8, Fig.10.9, Fig.10.10, Fig.10.11, Fig.10.12, Fig.10.13, Fig.10.14, Fig.10.15, Fig.10.16, Fig.10.17 (a), Fig.10.17 (b), Fig.10.18, Fig.10.19 (a), Fig.10.19 (b), Fig.10.19(c), Fig.10.20 Fig.10.21, Fig.10.22 Fig.10.23 Fig.10.24 Fig.10.25 Fig.10.26 (a), Fig.10.26 (b), Fig.10.27, Fig.10.28, Fig.10.29

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